## REMARKS

### Election/Restriction

The Examiner required restriction to one of the following inventions under 35 U.S.C. §121:

I. Claims 29-42 are, drawn to a method heat treating a thermal dissipation device, classified in class 148, subclass 577+.

II. Claims 43-45 are, drawn to a microelectronic package, classified in class 439, subclass 485+.

Claims 43-45 have been withdrawn by the Examiner.

Applicant hereby elects, without traverse, to prosecute the invention of Group I, as recited in claims 29-42.

### 35 U.S.C. § 103 Rejections

The Examiner has rejected claims 29-32 and 35-45 under 35 U.S.C. § 103 as being unpatentable over Burwen.

Claims 29 and 40 have been amended to include lowering the temperature of the thermal dissipation device to a cryogenic temperature after an intermediate temperature is maintained throughout. Specifically, claim 29 includes the limitation "after the intermediate temperature is maintained throughout the thermal dissipation device, exposing the thermal dissipation device to a second medium to lower the temperature of the thermal dissipation device to a cryogenic temperature."

Claim 40 has been amended to include lowering the temperature of the thermal dissipation device to a cryogenic temperature after an intermediate temperature is maintained throughout. Specifically, claim 40 includes the limitation "after the intermediate temperature is maintained throughout the material, lowering the temperature of the material to a cryogenic temperature at a second rate."

Burwen does not teach or suggest lowering the temperature of the thermal dissipation device to a cryogenic temperature after an intermediate temperature is maintained throughout. Burwen teaches a method for quench cooling a complicated metal shape while substantially avoiding distortion of the shape. A brazed assembly formed of the alloy 6061 is heated to about 970 degrees Fahrenheit (Column 3, lines 5-7). The assembly is then quenched by directing a massive flow of a refrigerated gaseous stream substantially simultaneously to all parts of the assembly and continuing the flow thereto until the assembly has cooled down to below the age-hardening temperature of the alloy from which it is constructed (Column 3, lines 7-12). The assembly is heated in an oven, and when the assembly reaches the desired temperature, it is exposed to the cooled air within a few seconds (Column 3, lines 31-35). Burwen thus discloses a process including heating an aluminum assembly and a one-step cooling process of exposing the assembly to refrigerated air. Specifically, Burwen does not teach or suggest lowering the temperature of the thermal dissipation device to a cryogenic temperature after an intermediate temperature is maintained throughout.

Therefore, claims 29 and 40 are patentable over Burwen because claims 29 and 40 include limitations that are not taught or suggested by Burwen.

Claims 30-34, 41, and 42 are dependent on either claims 29 or 40 and should be allowable for the same reasons as claims 29 and 40.

Applicants, accordingly, respectfully request withdrawal of the rejections of claims 29-30 and 35-45 under 35 U.S.C. § 103 as being unpatentable over Burwen.

The Examiner has rejected claims 28-32 and 35-45 under 35 U.S.C. § 103 as being unpatentable over Burwen in view of Dullberg and further teaching of Akram and Okuno. Applicant is assuming, based on the renumbering of the pending claims by the Examiner, that this rejection corresponds to claim 29-32 and 35-45.

Claim 29 has been amended to include lowering the temperature of the thermal dissipation device to a cryogenic temperature after an intermediate temperature is maintained throughout. Specifically, claim 29 includes the limitation "after the intermediate temperature is maintained throughout the thermal dissipation device, exposing the thermal dissipation device to a second medium to lower the temperature of the thermal dissipation device to a cryogenic temperature."

Claim 40 has been amended to include lowering the temperature of the thermal dissipation device to a cryogenic temperature after an intermediate temperature is maintained throughout. Specifically, claim 40 includes the limitation

"after the intermediate temperature is maintained throughout the material, lowering the temperature of the material to an intermediate temperature at a first rate."

As previously discussed, Burwen does not teach or suggest lowering the temperature of the thermal dissipation device to a cryogenic temperature after an intermediate temperature is maintained throughout.

Dullberg does not teach or suggest lowering the temperature of the thermal dissipation device to a cryogenic temperature after an intermediate temperature is maintained throughout. Dullberg teaches a quenching method for metal parts undergoing heat treatment for improving the physical properties thereof, such as full hardness, strength, and corrosion resistance for heat treatable aluminum alloys and all metals which experience a microstructural transformation nearing cooling (Column 2, lines 56-69). The aluminum part is heated by suitable means for a period of time sufficient to cause at least part or one or more of the constituents of the material to melt or go into solution (Column 3, lines 17-22). When the heating step has been completed, the part is then taken from the heating means and plunged directly into the liquid nitrogen contained in the dip tank (Column 3, lines 26-29). The time factor between the heating operation and the quench is critical in that the best metallurgical properties are obtained when the part is taken as rapidly as possible from the solution heat treating temperature level to a cryogenic temperature level (Column 3, lines 30-34). Any time lag between these two steps will adversely affect the physical benefits which are achieved (Column 3, lines 34-36). Therefore, Dullberg actually teaches a way from having an extra step in the

cooling process before the aluminum part is dipped into the liquid nitrogen. Dullberg thus teaches heating the aluminum part so that it at least partially melts and then immediately dipping the aluminum part directly into liquid nitrogen. Specifically, Dullberg does not teach or suggest lowering the temperature of the thermal dissipation device to a cryogenic temperature after an intermediate temperature is maintained throughout.

Akram does not teach or suggest lowering the temperature of the thermal dissipation device to a cryogenic temperature after an intermediate temperature is maintained throughout. Akram teaches a semiconductor package that increases the conduction of heat away from the die in a thermally conductive manner to facilitate heat transfer away from the die (Paragraph 0029). Akram does not mention any process for heating or cooling a thermal dissipation device. Akram thus discloses a semiconductor package with a conductive block housed on the die. Specifically, Akram does not teach or suggest lowering the temperature of the thermal dissipation device to a cryogenic temperature after an intermediate temperature is maintained throughout.

Okuno does not teach or suggest lowering the temperature of the thermal dissipation device to a cryogenic temperature after an intermediate temperature is maintained throughout. Okuno teaches an aluminum nitride sintered body for use in a heat sink (Column 1, lines 13-15). The material of the body is sintered at 1500-2000° C (Column 3, lines 12-13). The thermal conductivity of the heat sink increases as grain size increases (Column 4, lines 64-65). Okuno does not mention any process

for cooling the sintered body. Okuno thus teaches a method of sintering a body for use in a heat sink. Specifically, Okuno does not teach or suggest lowering the temperature of the thermal dissipation device to a cryogenic temperature after an intermediate temperature is maintained throughout.

Specifically, Burwen, Dullberg, Akram, and Okuno do not teach or suggest lowering the temperature of the thermal dissipation device to a cryogenic temperature after an intermediate temperature is maintained throughout. Therefore, claims 29 and 40 are patentable over Burwen in view of Dullberg and further teaching of Akram and Okuno because claims 29 and 40 include limitations that are not taught or suggested by Burwen, Dullberg, Akram, and Okuno.

Claims 30-34, 41, and 42 are dependent on either claims 29 or 40 and should be allowable for the same reasons as claims 29 and 40.

Applicant, accordingly, respectfully requests withdrawal of the rejections of claims 29-32 and 35-45 under 35 U.S.C. § 103 as being unpatentable over Burwen in view of Dullberg and further teaching of Akram and Okuno.

## ALLOWABLE CLAIMS

Applicants respectfully submit that the present application is in condition for allowance. If the Examiner believes a telephone conference would expedite or assist in the allowance of the present application, the Examiner is invited to call Michael A. Bernadicou at (408) 720-8300.

Pursuant to 37 C.F.R. 1.136(a)(3), applicant(s) hereby request and authorize the U.S. Patent and Trademark Office to (1) treat any concurrent or future reply that requires a petition for extension of time as incorporating a petition for extension of time for the appropriate length of time and (2) charge all required fees, including extension of time fees and fees under 37 C.F.R. 1.16 and 1.17, to Deposit Account No. 02-2666.

Respectfully submitted,

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